

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-183988

(43)Date of publication of application : 06.07.2001

(51)Int.Cl.

G09F 9/00

H04N 5/66

(21)Application number : 11-367976

(71)Applicant : ARISAWA MFG CO LTD

(22)Date of filing : 24.12.1999

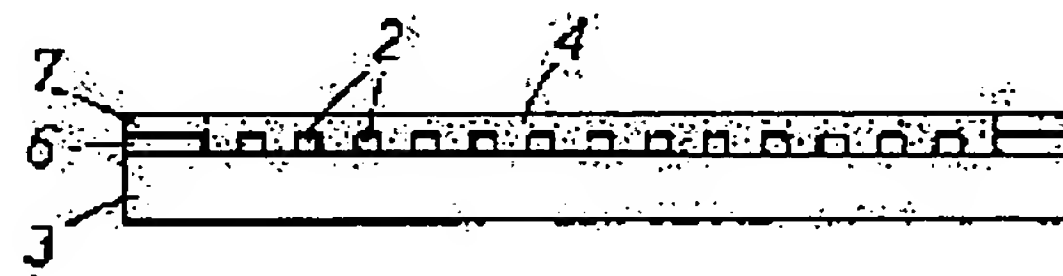
(72)Inventor : KOSAKAI MAMORU

## (54) FRONT PLATE FOR PLASMA DISPLAY AND ITS MANUFACTURING METHOD

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a front plate for plasma display, which generates no irregular reflection of external light and no distortion of a plasma display image, can be obtained by simple processes and is excellent in practicability and productivity, and to provide a method for manufacturing the front plate for plasma display.

SOLUTION: The front plate for plasma display has a function for shielding electromagnetic wave generated from the plasma display 1 by a mesh-shaped conductive part 2 and a substrate 3 is provided with the mesh-shaped conductive part 2. Further an UV curing type resin layer 4 is provided at a side of the mesh-shaped conductive part 2 of the substrate 3 in a state burying the mesh-shaped conductive part 2.



## LEGAL STATUS

[Date of request for examination] 04.03.2004

[Date of sending the examiner's decision of rejection] 29.09.2005

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**CLAIMS**

---

[Claim(s)]

[Claim 1] The front plate for plasma displays characterized by being the front plate for plasma displays which has the function which shields the electromagnetic wave generated from a plasma display by the mesh-like current carrying part, preparing a mesh-like current carrying part in a substrate, and preparing UV hardening mold resin layer in the condition of laying this mesh-like current carrying part under the mesh-like current-carrying-part side of this substrate.

[Claim 2] It is the front plate for plasma displays which the energization section which are formed successively with a mesh-like current carrying part, and is connected to the ground of a plasma display is prepared in the perimeter of a mesh-like current carrying part in the front plate for plasma displays according to claim 1, and is characterized by being made to expose this energization section.

[Claim 3] It is the manufacture approach of the front plate for plasma displays of having the function which shields the electromagnetic wave generated from a plasma display by the mesh-like current carrying part. Prepare a mesh-like current carrying part in a substrate, then UV hardening mold resin is applied on this substrate. Then, the manufacture approach of the front plate for plasma displays characterized by laying a support plate on this UV hardening mold resin, and graduating the front face of this UV hardening mold resin, then irradiating UV light, and hardening said UV hardening mold resin.

[Claim 4] The manufacture approach of the front plate for plasma displays characterized by exfoliating a support plate in the manufacture approach of the front plate for plasma displays according to claim 3 after hardening UV hardening mold resin.

[Claim 5] The manufacture approach of the front plate for plasma displays characterized by laying a support plate on this UV hardening mold resin as UV hardening mold resin is contacted in the field which applied the release agent to the support plate and applied this release agent in the manufacture approach of the front plate for plasma displays according to claim 4.

[Claim 6] The manufacture approach of the front plate for plasma displays characterized by to apply UV hardening mold resin on this substrate, to remove after hardening of UV hardening mold resin, and said masking material, and to make the energization section expose after preparing the energization section in this substrate and covering this energization section by masking material in the manufacture approach of the front plate for plasma displays given in claim 3 - 5 any 1 terms, in case a mesh-like current carrying part is prepared in a substrate.

---

[Translation done.]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the front plate for plasma displays which has the function which shields the electromagnetic wave generated from a plasma display by the mesh-like current carrying part, and its manufacture approach.

[0002]

[Description of the Prior Art] The plasma display is proposed as a kind of a display. This plasma display carried out \*\* ON of the gas into the fluorescent substance used as a pixel, and impress the high voltage, it made it discharge in this gas, and the principle which makes said fluorescent substance emit light by this discharge is used for it.

[0003] In this plasma display, in order to form an image by said pixel, many pixels are required, but if it discharges by the pixel of these large number, a pulse-like high current will flow to the electrode which impresses the high voltage to the drive circuit and gas which are made to generate the high voltage, and an electromagnetic wave will occur according to the high current of the shape of this pulse. Therefore, the configuration which shields an electromagnetic wave is required for a plasma display because of incorrect actuation prevention of the electronic equipment by this electromagnetic wave, and the effect prevention to the body.

[0004] As a configuration which shields this electromagnetic wave, as illustrated to drawing 1 and 2 Stick copper foil on the transparent PET plate 23 with adhesives 29, and it is followed. Form the energization section 26 formed successively by the periphery section of this PET plate 23 at this mesh-like current carrying part 22 while forming the mesh-like current carrying part 22 in the condition that super-thin copper wire intersected this PET plate 23 by etching this copper foil, and the front plate A is obtained. The configuration which arranges this front plate A in the front face of a plasma display 1 is proposed.

According to this configuration, in case said electromagnetic wave passes the mesh-like current carrying part 22, it is transformed into the electrical and electric equipment, and this electrical and electric equipment is emitted from a proper ground via the energization section 26 from the mesh-like current carrying part 22.

[0005] By the way, this front plate A is opaque where the mesh-like current carrying part 22 is formed. This is because it remains into the part to which the adhesives 29 used when sticking copper foil carried out etching removal of this copper foil, the front face of these adhesives 29 is the rough \*\*\*\* irregularity side 30 by said etching and this concave convex 30 reflects outdoor daylight irregularly.

[0006] Therefore, in the former, in order to prevent the scattered reflection by this concave convex 30, the transparence resin film 31 is stuck so that the adhesives 29 and mesh-like current-carrying-part 22 top may be covered, and the concave convex 30 of these adhesives 29 is concealed (refer to the enlarged drawing of drawing 1 ).

[0007] However, there is a level difference by the part where the mesh-like current carrying part 22 exists, and the part which is not so (existence of the space 32 in the enlarged drawing of drawing 1 ), and the handling of the transparence resin film 31 is still more troublesome, it breaks [ since the transparence resin film 31 is therefore distorted a little, there is a trouble of distorting the image of a plasma display 1, and ] with this conventional approach, and there is a trouble of being easy to generate JIWA.

[0008] Moreover, although a means to perform hotpress processing is also in the field in which the mesh-like current carrying part 22 of the front plate A was formed in order to prevent the scattered reflection by the concave convex 30, in the case of hotpress processing, the front face of the PET plate 3 is distorted, or the Yuzu skin occurs in many cases, and there is a trouble of distorting the image of a plasma display 1.

[0009] This invention solves the above-mentioned trouble, and does not have the scattered reflection of



outdoor daylight, and the front plate for plasma displays which exceeded for the practicality which can moreover obtain the front plate for plasma displays which does not distort the image of a plasma display according to an easy process, and productivity, and its manufacture approach are offered.

[0010]

[Means for Solving the Problem] The summary of this invention is explained with reference to an accompanying drawing.

[0011] It is the front plate for plasma displays which has the function which shields the electromagnetic wave generated from a plasma display 1 by the mesh-like current carrying part 2, the mesh-like current carrying part 2 is formed in a substrate 3, and the front plate for plasma displays characterized by forming UV hardening mold resin layer 4 in the condition of laying this mesh-like current carrying part 2 under the mesh-like current-carrying-part 2 side of this substrate 3 is started.

[0012] Moreover, in the front plate for plasma displays according to claim 1, the energization section 6 which are formed successively with the mesh-like current carrying part 2, and is connected to the ground of a plasma display 1 is formed in the perimeter of the mesh-like current carrying part 2, and this energization section 6 starts the front plate for plasma displays characterized by being made to expose.

[0013] Moreover, it is the manufacture approach of the front plate for plasma displays of having the function which shields the electromagnetic wave generated from a plasma display 1 by the mesh-like current carrying part 2. Form the mesh-like current carrying part 2 in a substrate 3, then UV hardening mold resin is applied on this substrate 3. Then, the manufacture approach of the front plate for plasma displays characterized by laying a support plate 5 on this UV hardening mold resin, and graduating the front face of this UV hardening mold resin, then irradiating UV light, and hardening said UV hardening mold resin is started.

[0014] Moreover, in the manufacture approach of the front plate for plasma displays according to claim 3, after hardening UV hardening mold resin, the manufacture approach of the front plate for plasma displays characterized by exfoliating a support plate 5 is started.

[0015] Moreover, in the manufacture approach of the front plate for plasma displays according to claim 4, the manufacture approach of the front plate for plasma displays characterized by laying a support plate 5 on this UV hardening mold resin as UV hardening mold resin is contacted in the field which applied the release agent to the support plate 5, and applied this release agent is started.

[0016] Moreover, it sets to the manufacture approach of the front plate for plasma displays given in claim 3 - 5 any 1 terms. In case the mesh-like current carrying part 2 is formed in a substrate 3, the energization section 6 is formed in this substrate 3. After covering this energization section 6 by the masking material 7, UV hardening mold resin is applied on this substrate 3, and the manufacture approach of the front plate for plasma displays characterized by removing said masking material 7 and making the energization section 6 expose takes after hardening of UV hardening mold resin.

[0017]

[Function and Effect of the Invention] Since UV hardening mold resin layer 4 is formed in the condition of laying the mesh-like current carrying part 2 under the substrate 3, the adhesives 9 which were used when forming the mesh-like current carrying part 2 in a substrate 3, and remained on this substrate 3 will unite with UV hardening mold resin layer 4, and the irregularity 10 by these adhesives 9 will disappear.

[0018] Moreover, UV hardening mold resin is transparent, exceeds to smooth nature, and serves as a front plate for plasma displays which exceeded optically.

[0019] Since it is made for this example to be a \*\*\*\*, it does not have the scattered reflection of outdoor daylight and serves as a front plate for plasma displays which moreover exceeded in the practicality which does not distort the image of a plasma display, and its manufacture approach.

[0020]

[Embodiment of the Invention] A drawing illustrates one example of this invention and explains it below.

[0021] A PET plate transparent as a substrate 3 is adopted. In addition, this PET plate is treated in the state of the reinforcement stuck on the glass plate or the acrylic board.

[0022] Copper foil 8 is stuck on one side of this substrate 3 through adhesives 9.

[0023] Then, while forming the mesh-like current carrying part 2 by which super-thin copper wire was arranged in the shape of a mesh on the substrate 3 by removing the predetermined part of copper foil 8 by etching processing, the energization section 6 connected to a ground at the periphery section of this substrate 3 is formed in a surrounding condition. Under the present circumstances, in the part to which the copper foil 8 on a substrate 3 was removed, adhesives 9 remain by surface concave convex voice by said etching processing (refer to drawing 3 ).

[0024] Then, the masking material 7 is made to apply and harden on the energization section 6, and the

masking material 7 is formed on this energization section 6.

[0025] Then, UV hardening mold resin is applied to a substrate 3 and the mesh-like current carrying part 2, and it is completely a wrap about a substrate 3 and the mesh-like current carrying part 2 by this UV hardening mold resin. In addition, you may make it UV hardening mold resin cover the masking material 7 in this case.

[0026] What has moderate viscosity from which this UV hardening mold resin contacts the concave convex 10 of said adhesives 9 completely without a clearance, and this UV hardening mold resin is held with given thickness on a substrate 3 is used for UV hardening mold resin. Specifically, UV hardening mold resin of an urethane acrylate system etc. is adopted.

[0027] Then, the plate-like support plate 5 of the magnitude which can cover a substrate 3 top completely is laid on UV hardening mold resin. Furthermore, rolling migration of the roller 11 is carried out on a support plate 5, and this support plate 5 and UV hardening mold resin are made into a perfect adhesion condition without existence of air bubbles (refer to drawing 4 ).

[0028] This support plate 5 applies release agents, such as silicone oil, to the field which contacts UV hardening mold resin. Moreover, the film with which the release agent was applied beforehand is prepared as this release agent, and the configuration which sticks this film on a support plate 5 may be adopted. In addition, when the detachability of a support plate 5 and UV hardening mold resin is good, \*\* is also good without a release agent.

[0029] Furthermore, the support plate 5 with a thickness of 0.5mm or more is adopted so that it may not deform with a self-weight. Moreover, a polycarbonate plate or an acrylic board is used for a support plate 5.

[0030] Then, UV light (this UV light shows the thing of light including UV region.) is irradiated at UV hardening mold resin, this UV hardening mold resin is hardened, and UV hardening mold resin layer 4 is formed. In addition, this UV light is good to irradiate from the transparent substrate 3 side. Moreover, when a support plate 5 is transparent, you may irradiate from a support plate 5 side.

[0031] Since hardening contraction hardly generates UV hardening mold resin in the case of hardening of this UV hardening mold resin, the concave convex 10 of said adhesives 9 and adhesion with a support plate 5 are maintained.

[0032] Then, a support plate 5 is exfoliated from on UV hardening mold resin layer 4 (refer to drawing 5 ). Furthermore, the masking material 7 is exfoliated and the energization section 6 is made to expose.

[0033] By the way, from a plasma display 1, a near infrared ray is generated besides an electromagnetic wave. Therefore, in order to also shield this near infrared ray, it is good to stick a near infrared ray absorption film on the rear-face side of a substrate 3.

[0034] It becomes the front plate for plasma displays which UV hardening mold resin will be prepared on a substrate 3, and the concave convex 10 of adhesives 9 will be concealed since it is made for this example to be a \*\*\*\*, and exceeded for the practicality which the front face of this UV hardening mold resin layer 4 is moreover smooth, and can prevent the scattered reflection of outdoor daylight certainly, and productivity.

[0035] This UV hardening mold resin layer 4 has a smooth front face, and does not reflect outdoor daylight irregularly.

[0036] Moreover, since UV hardening mold resin exceeds in transparency, when it considers as the front plate A for plasma displays, it does not distort the image of a plasma display 1.

[0037] Moreover, since UV hardening mold resin exceeds to surface smooth nature, after forming the mesh-like current carrying part 2 in a substrate 3, By applying UV hardening mold resin on this substrate 3, laying a support plate 5 on this UV hardening mold resin, hardening this UV hardening mold resin, then exfoliating a support plate 5 It becomes the manufacture approach of the front plate for plasma displays of having exceeded for the practicality which can form easily UV hardening mold resin layer 4 with a smooth front face on a substrate 3 and the mesh-like current carrying part 2, and productivity.

[0038] Moreover, since the process which makes smooth the front face of UV hardening mold resin layer 4 lays a support plate 5 on UV hardening mold resin before hardening and only exfoliates a support plate 5 after hardening of UV hardening mold resin, it serves as the manufacture approach of the front plate for plasma displays of having exceeded for the practicality which can make smooth the front face of UV hardening mold resin layer 4 very easily, and productivity.

[0039] Moreover, since rolling migration of the roller 11 is carried out on this support plate 5 and this support plate 5 and UV hardening mold resin are stuck without a clearance after laying a support plate 5 on UV hardening mold resin before hardening The shape of surface type of UV hardening mold resin layer will agree with a contact side with a support plate 5 certainly, and serves as the manufacture approach of the front plate for plasma displays of having exceeded in the practicality which can make smooth certainly the

front face of UV hardening mold resin layer 4.

[0040] Moreover, since the release agent is applied to the support plate 5, it becomes the manufacture approach of the front plate for plasma displays of having exceeded the support plate 5 for the practicality which can exfoliate easily, and productivity from UV hardening mold resin after hardening.

[0041] Moreover, after covering the energization section 6 by the masking material 7, UV hardening mold resin is applied, and it becomes the manufacture approach of the front plate for plasma displays of having exceeded for the practicality to which the energization section 6 can be simply exposed by removing said masking material 7 after hardening of this UV hardening mold resin, and productivity.

[0042] Although the approach of applying the transparent adhesives made of synthetic resin in this point and the former so that the surface adhesives 29 and the surface mesh-like current carrying part 22 of a substrate 23 may be covered, and sticking a transparence resin film on these adhesives was also proposed In the case of this approach, in order to expose the energization section 26 top, cutting removal of the transparence resin film on this energization section 26 had to be carried out, and there was a trouble that this cutting removal activity was very troublesome. However, in this application, there is such no problem and the energization section 6 can be formed easily as mentioned above.

[0043] In addition, although the case where it carried out in the front plate A for plasma displays formed when the mesh-like current carrying part 2 carried out etching processing of the copper foil 8 was explained in full detail, this example can be applied also in the manufacture approach of the front plate for plasma displays of having the function which shields the electromagnetic wave generated from other plasma displays by the mesh-like current carrying part, when the mesh-like current carrying part 2 is formed by sticking a fiber textiles mesh on a substrate 3.

---

[Translation done.]



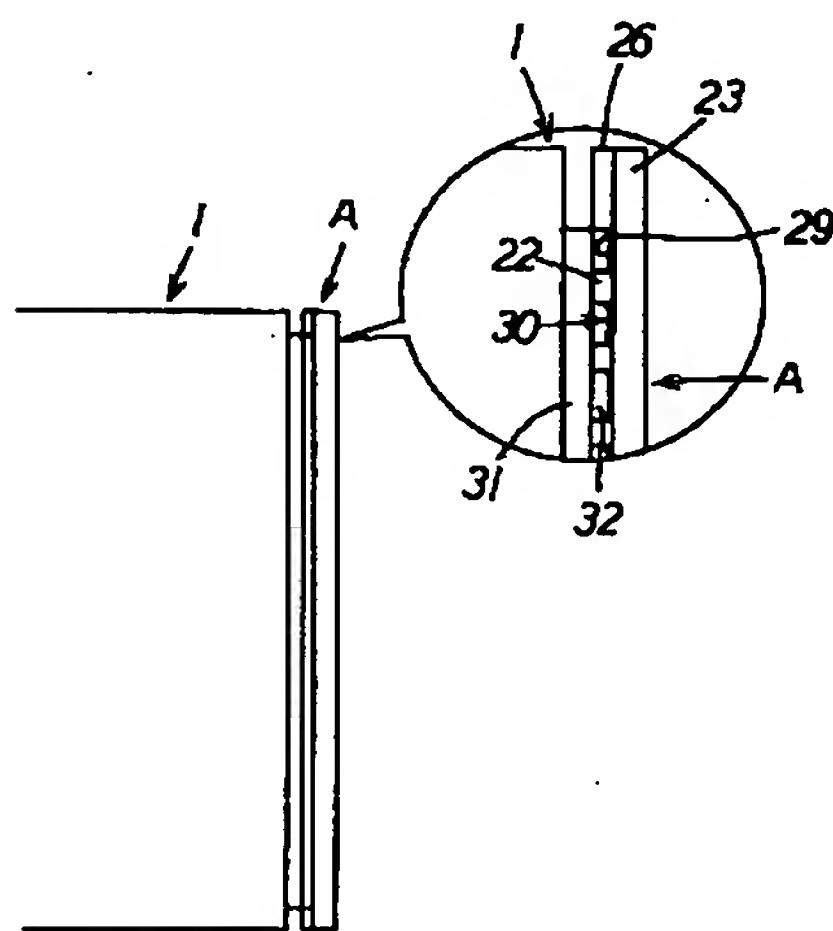
## \* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

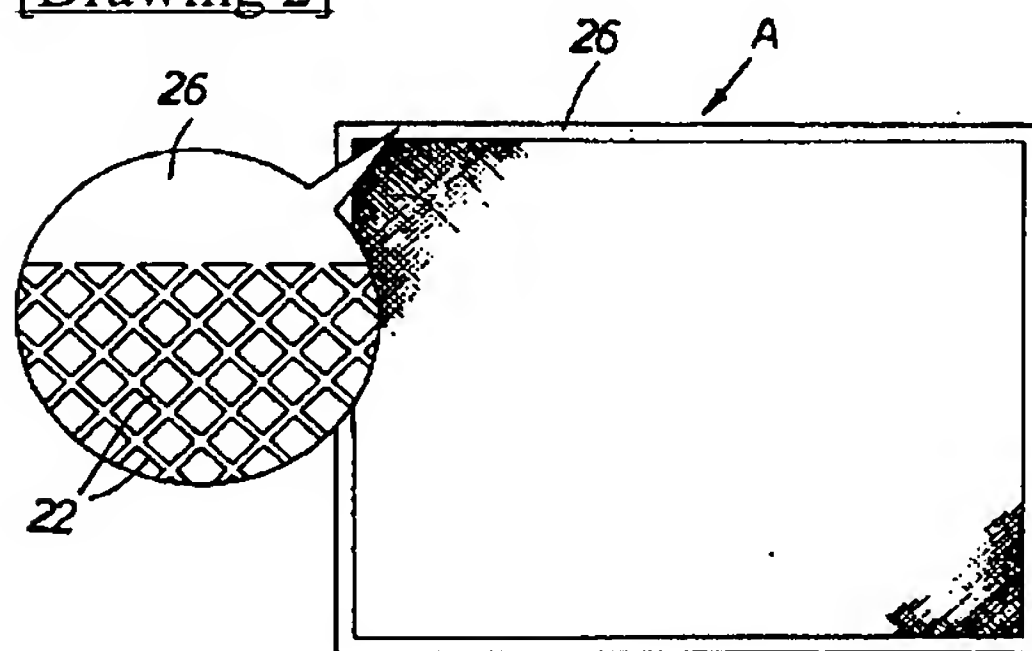
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

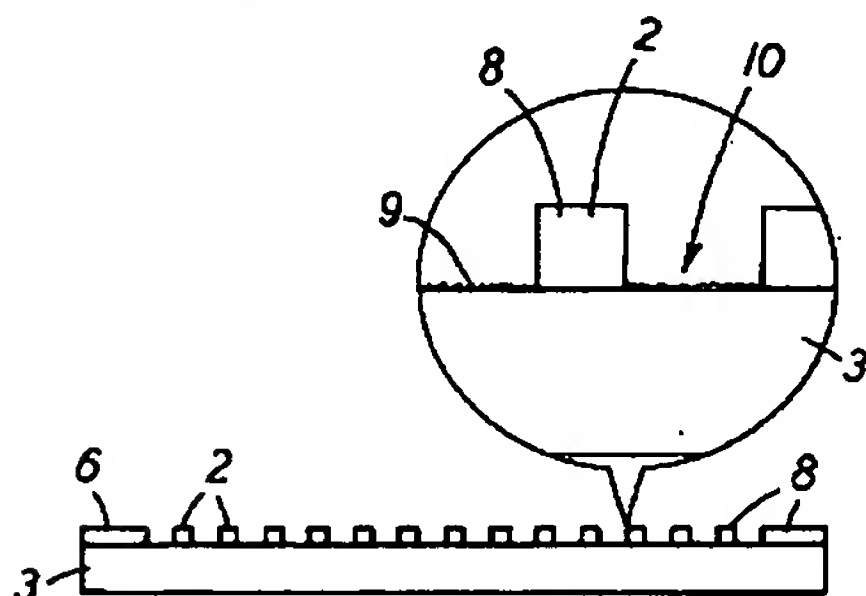
[Drawing 1]



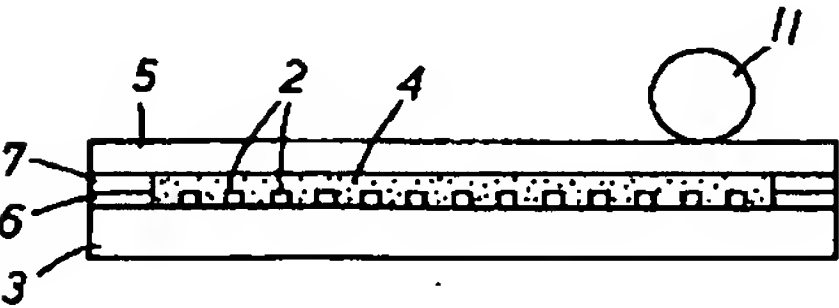
[Drawing 2]



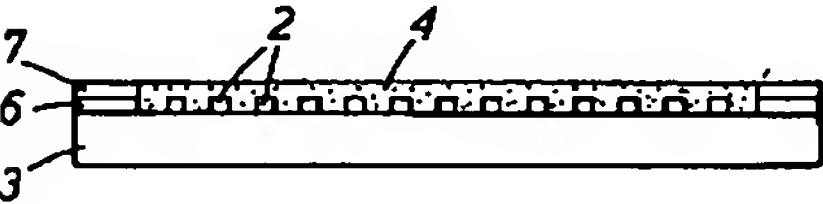
[Drawing 3]



[Drawing 4]



[Drawing 5]



---

[Translation done.]



## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-183988

(43)Date of publication of application : 06.07.2001

(51)Int.Cl.

G09F 9/00  
H04N 5/66

(21)Application number : 11-367976

(71)Applicant : ARISAWA MFG CO LTD

(22)Date of filing : 24.12.1999

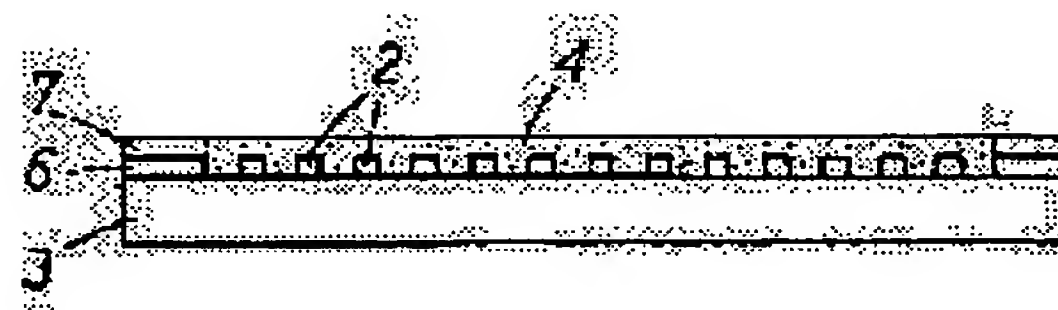
(72)Inventor : KOSAKAI MAMORU

## (54) FRONT PLATE FOR PLASMA DISPLAY AND ITS MANUFACTURING METHOD

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a front plate for plasma display, which generates no irregular reflection of external light and no distortion of a plasma display image, can be obtained by simple processes and is excellent in practicability and productivity, and to provide a method for manufacturing the front plate for plasma display.

SOLUTION: The front plate for plasma display has a function for shielding electromagnetic wave generated from the plasma display 1 by a mesh-shaped conductive part 2 and a substrate 3 is provided with the mesh-shaped conductive part 2. Further an UV curing type resin layer 4 is provided at a side of the mesh-shaped conductive part 2 of the substrate 3 in a state burying the mesh-shaped conductive part 2.



## LEGAL STATUS

[Date of request for examination]

04.03.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

(19)日本国特許庁 (J P)

(12) 公 開 特 許 公 報 (A)

(11)特許出願公開番号  
特開2001-183988  
(P2001-183988A)

(43)公開日 平成13年7月6日(2001.7.6)

(51)Int.Cl. <sup>7</sup>	識別記号	F I	テ-マ-ト*(参考)
G 0 9 F 9/00	3 0 9	G 0 9 F 9/00	3 0 9 A 5 C 0 5 8
H 0 4 N 5/66	1 0 1	H 0 4 N 5/66	1 0 1 A 5 G 4 3 5

審査請求 未請求 請求項の数6 O L (全 5 頁)

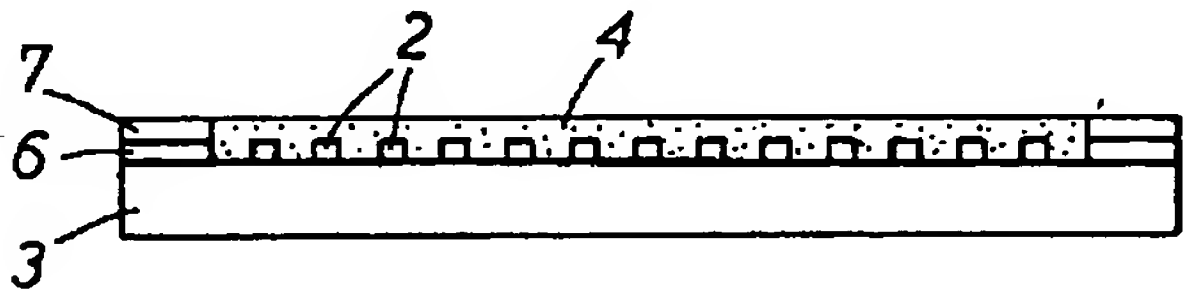
(21)出願番号	特願平11-367976	(71)出願人	000155698 株式会社有沢製作所 新潟県上越市南本町1丁目5番5号
(22)出願日	平成11年12月24日(1999.12.24)	(72)発明者	小堺 守 新潟県上越市南本町1丁目5番5号 株式 会社有沢製作所内
		(74)代理人	100091373 弁理士 吉井 剛 (外1名)
		Fターム(参考)	5C058 AA11 BA33 BA35 5G435 AA00 AA01 AA16 AA17 BB06 GG33 GG34 HH12 HH14 KK07

(54)【発明の名称】 プラズマディスプレイ用前面板及びその製造方法

(57)【要約】

【課題】 外光の乱反射がなく、しかも、プラズマディスプレイの画像を歪めてしまうことのないプラズマディスプレイ用前面板を簡単な工程により得ることができる実用性、生産性に秀れたプラズマディスプレイ用前面板及びその製造方法を提供するものである。

【解決手段】 プラズマディスプレイ1から発生する電磁波をメッシュ状導電部2によりシールドする機能を有するプラズマディスプレイ用前面板であって、基板3にはメッシュ状導電部2が設けられ、この基板3のメッシュ状導電部2側には該メッシュ状導電部2を埋設する状態でUV硬化型樹脂層4が設けられているものである。



【特許請求の範囲】

【請求項1】 プラズマディスプレイから発生する電磁波をメッシュ状導電部によりシールドする機能を有するプラズマディスプレイ用前面板であって、基板にはメッシュ状導電部が設けられ、この基板のメッシュ状導電部側には該メッシュ状導電部を埋設する状態でUV硬化型樹脂層が設けられていることを特徴とするプラズマディスプレイ用前面板。

【請求項2】 請求項1記載のプラズマディスプレイ用前面板において、メッシュ状導電部の周囲には、メッシュ状導電部と連設され且つプラズマディスプレイのアースに接続される通電部が設けられ、この通電部は露出せしめられていることを特徴とするプラズマディスプレイ用前面板。

【請求項3】 プラズマディスプレイから発生する電磁波をメッシュ状導電部によりシールドする機能を有するプラズマディスプレイ用前面板の製造方法であって、基板にメッシュ状導電部を設け、続いて、この基板上にUV硬化型樹脂を塗布し、続いて、このUV硬化型樹脂上に支持板を載置して該UV硬化型樹脂の表面を平滑化し、続いて、UV光を照射して前記UV硬化型樹脂を硬化することを特徴とするプラズマディスプレイ用前面板の製造方法。

【請求項4】 請求項3記載のプラズマディスプレイ用前面板の製造方法において、UV硬化型樹脂を硬化した後、支持板を剥離することを特徴とするプラズマディスプレイ用前面板の製造方法。

【請求項5】 請求項4記載のプラズマディスプレイ用前面板の製造方法において、支持板に離型材を塗布し、この離型材を塗布した面をUV硬化型樹脂に当接するようにして該UV硬化型樹脂上に支持板を載置することを特徴とするプラズマディスプレイ用前面板の製造方法。

【請求項6】 請求項3～5いずれか1項に記載のプラズマディスプレイ用前面板の製造方法において、基板にメッシュ状導電部を設ける際、該基板に通電部を設け、この通電部をマスキング材で覆った後、この基板上にUV硬化型樹脂を塗布し、UV硬化型樹脂の硬化後、前記マスキング材を除去して通電部を露出せしめることを特徴とするプラズマディスプレイ用前面板の製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、プラズマディスプレイから発生する電磁波をメッシュ状導電部によりシールドする機能を有するプラズマディスプレイ用前面板及びその製造方法に関するものである。

【0002】

【従来の技術及び発明が解決しようとする課題】ディスプレイの一種としてプラズマディスプレイが提案されている。このプラズマディスプレイは、画素となる蛍光体中にガスを詰入し、該ガスに高電圧を印加して放電さ

せ、この放電により前記蛍光体を発光させる原理を採用している。

【0003】このプラズマディスプレイにおいて、前記画素により画像を形成する為には多数の画素が必要であるが、この多数の画素で放電を行うと、高電圧を発生させる駆動回路及びガスに高電圧を印加する電極にパルス状の大電流が流れ、このパルス状の大電流により電磁波が発生する。従って、この電磁波による電子機器の誤作動防止及び人体への影響防止の為、プラズマディスプレイには電磁波をシールドする構成が必要である。

【0004】この電磁波をシールドする構成として、図1、2に図示したように、透明なPET板23に銅箔を接着剤29により貼着し、続いて、該銅箔をエッチングすることで該PET板23に極細銅線が交叉した状態のメッシュ状導電部22を形成すると共に該PET板23の外周部に該メッシュ状導電部22に連設された通電部26を形成して前面板Aを得、この前面板Aをプラズマディスプレイ1の前面に配設する構成が提案されている。この構成によれば、前記電磁波はメッシュ状導電部22を通過する際に電気に変換され、該電気はメッシュ状導電部22から通電部26を経由して適宜なアースから放出される。

【0005】ところで、この前面板Aはメッシュ状導電部22が形成された状態では不透明となっている。これは、銅箔を貼着する際に使用された接着剤29が該銅箔をエッチング除去した部分に残存し、この接着剤29の表面が前記エッチングにより粗れて凹凸面30となっており、該凹凸面30が外光を乱反射してしまうからである。

【0006】従って、従来では、この凹凸面30による乱反射を防止する為、接着剤29及びメッシュ状導電部22上を覆うように透明樹脂フィルム31を貼着して、該接着剤29の凹凸面30を隠蔽している（図1の拡大図参照）。

【0007】しかし、この従来の方法では、メッシュ状導電部22が存在する部位とそうでない部位とで段差があり（図1の拡大図中の空間32の存在）よって、透明樹脂フィルム31が若干歪んでしまう為にプラズマディスプレイ1の画像を歪めてしまうという問題点があり、更に透明樹脂フィルム31の取り扱いが厄介で折れジワが発生し易い等の問題点がある。

【0008】また、凹凸面30による乱反射を防止する為、前面板Aのメッシュ状導電部22が形成された面にホットプレス処理を施す手段もあるが、ホットプレス処理の際にPET板3の表面が歪んだり、ゆず肌が発生することが多く、プラズマディスプレイ1の画像を歪めてしまうという問題点がある。

【0009】本発明は、上記問題点を解決するもので、外光の乱反射がなく、しかも、プラズマディスプレイの画像を歪めてしまうことのないプラズマディスプレイ用前面板を簡単な工程により得ることができる実用性、生産性に秀れたプラズマディスプレイ用前面板及びその製造方法を提供するものである。



【0010】

【課題を解決するための手段】添付図面を参照して本発明の要旨を説明する。

【0011】プラズマディスプレイ1から発生する電磁波をメッシュ状導電部2によりシールドする機能を有するプラズマディスプレイ用前面板であって、基板3にはメッシュ状導電部2が設けられ、この基板3のメッシュ状導電部2側には該メッシュ状導電部2を埋設する状態でUV硬化型樹脂層4が設けられていることを特徴とするプラズマディスプレイ用前面板に係るものである。

【0012】また、請求項1記載のプラズマディスプレイ用前面板において、メッシュ状導電部2の周囲には、メッシュ状導電部2と連設され且つプラズマディスプレイ1のアースに接続される通電部6が設けられ、この通電部6は露出せしめられていることを特徴とするプラズマディスプレイ用前面板に係るものである。

【0013】また、プラズマディスプレイ1から発生する電磁波をメッシュ状導電部2によりシールドする機能を有するプラズマディスプレイ用前面板の製造方法であって、基板3にメッシュ状導電部2を設け、続いて、この基板3上にUV硬化型樹脂を塗布し、続いて、このUV硬化型樹脂上に支持板5を載置して該UV硬化型樹脂の表面を平滑化し、続いて、UV光を照射して前記UV硬化型樹脂を硬化することを特徴とするプラズマディスプレイ用前面板の製造方法に係るものである。

【0014】また、請求項3記載のプラズマディスプレイ用前面板の製造方法において、UV硬化型樹脂を硬化した後、支持板5を剥離することを特徴とするプラズマディスプレイ用前面板の製造方法に係るものである。

【0015】また、請求項4記載のプラズマディスプレイ用前面板の製造方法において、支持板5に離型材を塗布し、この離型材を塗布した面をUV硬化型樹脂に当接するようにして該UV硬化型樹脂上に支持板5を載置することを特徴とするプラズマディスプレイ用前面板の製造方法に係るものである。

【0016】また、請求項3～5いずれか1項に記載のプラズマディスプレイ用前面板の製造方法において、基板3にメッシュ状導電部2を設ける際、該基板3に通電部6を設け、この通電部6をマスキング材7で覆った後、この基板3上にUV硬化型樹脂を塗布し、UV硬化型樹脂の硬化後、前記マスキング材7を除去して通電部6を露出せしめることを特徴とするプラズマディスプレイ用前面板の製造方法に係るものである。

【0017】

【発明の作用及び効果】基板3にはメッシュ状導電部2を埋設する状態でUV硬化型樹脂層4が設けられている為、基板3にメッシュ状導電部2を設ける際に使用され該基板3上に残存した接着剤9がUV硬化型樹脂層4と一体化しており、該接着剤9による凹凸10が消えることになる。

【0018】また、UV硬化型樹脂は透明で平滑性に秀れており、光学的に秀れたプラズマディスプレイ用前面板となる。

【0019】本実施例は上述のようにするから、外光の乱反射がなく、しかも、プラズマディスプレイの画像を歪めてしまうことのない実用性に秀れたプラズマディスプレイ用前面板及びその製造方法となる。

【0020】

【発明の実施の形態】図面は本発明の一実施例を図示したものであり、以下に説明する。

【0021】基板3として透明なPET板を採用する。尚、このPET板は、ガラス板若しくはアクリル板に貼着された補強状態で扱う。

【0022】この基板3の片面に接着剤9を介して銅箔8を貼着する。

【0023】続いて、銅箔8の所定部位をエッチング処理によって除去することにより、基板3上に極細銅線がメッシュ状に配設されたメッシュ状導電部2を設けると共に、該基板3の外周部にアースに接続される通電部6を囲繞状態に設ける。この際、基板3上の銅箔8が除去された部位には、前記エッチング処理により接着剤9が表面凹凸状態で残存する(図3参照)。

【0024】続いて、通電部6上にマスキング材7を塗布、硬化せしめて、該通電部6上にマスキング材7を設ける。

【0025】続いて、基板3及びメッシュ状導電部2にUV硬化型樹脂を塗布し、該UV硬化型樹脂により基板3及びメッシュ状導電部2を完全に覆う。尚、この際、UV硬化型樹脂がマスキング材7を覆うようにしても良い。

【0026】UV硬化型樹脂は、該UV硬化型樹脂が前記接着剤9の凹凸面10と隙間なく完全に当接し、且つ、該UV硬化型樹脂が基板3上に所定厚で保持されるような適度な粘度を有するものを採用する。具体的にはウレタンアクリレート系のUV硬化型樹脂等を採用する。

【0027】続いて、UV硬化型樹脂上に基板3上を完全に覆うことができる大きさの平板状の支持板5を載置する。更に、支持板5上でローラ11を転動移動させ、該支持板5とUV硬化型樹脂とを気泡の存在がない完全な密着状態とする(図4参照)。

【0028】この支持板5は、UV硬化型樹脂と当接する面にシリコンオイル等の離型材を塗布しておく。また、この離型材として、予め離型材が塗布されたフィルムを用意しておき、該フィルムを支持板5に貼着する構成を採用しても良い。尚、支持板5とUV硬化型樹脂との剥離性が良い場合には、離型材を使用せずとも良い。

【0029】更に、自重によって変形したりしないように厚さ0.5mm以上の支持板5を採用する。また、支持板5は、ポリカーボネート板若しくはアクリル板等を採用する。



【0030】続いて、UV硬化型樹脂にUV光（このUV光とはUV域を含む光のことを示す。）を照射し、該UV硬化型樹脂を硬化してUV硬化型樹脂層4を形成する。尚、このUV光は、透明である基板3側から照射すると良い。また、支持板5が透明な場合には支持板5側から照射しても良い。

【0031】このUV硬化型樹脂の硬化の際、UV硬化型樹脂は硬化収縮が殆ど発生しない為、前記接着剤9の凹凸面10及び支持板5との密着が維持される。

【0032】続いて、UV硬化型樹脂層4上から支持板5を剥離する（図5参照）。更に、マスキング材7を剥離して通電部6を露出せしめる。

【0033】ところで、プラズマディスプレイ1からは、電磁波以外にも近赤外線が発生する。従って、この近赤外線もシールドする為、基板3の裏面側に近赤外線吸収フィルムを貼着すると良い。

【0034】本実施例は上述のようにするから、基板3上にUV硬化型樹脂が設けられて接着剤9の凹凸面10が隠蔽されることになり、しかも、このUV硬化型樹脂層4の表面が平滑で、外光の乱反射を確実に防止することができる実用性、生産性に秀れたプラズマディスプレイ用前面板となる。

【0035】このUV硬化型樹脂層4は表面が平滑であり、外光を乱反射したりしない。

【0036】また、UV硬化型樹脂は透明性に秀れる為、プラズマディスプレイ用前面板Aとした際にプラズマディスプレイ1の画像を歪めたりしない。

【0037】また、UV硬化型樹脂は表面平滑性に秀れている為、基板3にメッシュ状導電部2を設けた後、該基板3上にUV硬化型樹脂を塗布し、続いて、該UV硬化型樹脂上に支持板5を載置し、続いて、該UV硬化型樹脂を硬化し、続いて、支持板5を剥離することで、基板3及びメッシュ状導電部2上に表面が平滑なUV硬化型樹脂層4を簡単に形成できることになる実用性、生産性に秀れたプラズマディスプレイ用前面板の製造方法となる。

【0038】また、UV硬化型樹脂層4の表面を平滑にする工程は、硬化前のUV硬化型樹脂上に支持板5を載置し、UV硬化型樹脂の硬化後に支持板5を剥離するだけであるから、非常に簡単にUV硬化型樹脂層4の表面を平滑にすることができる実用性、生産性に秀れたプラズマディスプレイ用前面板の製造方法となる。

【0039】また、硬化前のUV硬化型樹脂上に支持板5を載置した後、該支持板5上でローラ11を転動移動せしめて該支持板5とUV硬化型樹脂とを隙間なく密着さ

せるから、UV硬化型樹脂層の表面形状は支持板5との当接面と確実に合致することになり、UV硬化型樹脂層4の表面を確実に平滑にすることができる実用性に秀れたプラズマディスプレイ用前面板の製造方法となる。

【0040】また、支持板5には離型材が塗布されているから、硬化後のUV硬化型樹脂から支持板5を簡単に剥離することができる実用性、生産性に秀れたプラズマディスプレイ用前面板の製造方法となる。

【0041】また、通電部6をマスキング材7で覆った後でUV硬化型樹脂を塗布し、該UV硬化型樹脂の硬化後に前記マスキング材7を除去することで簡単に通電部6を露出させることができる実用性、生産性に秀れたプラズマディスプレイ用前面板の製造方法となる。

【0042】この点、従来において、基板23の表面の接着剤29及びメッシュ状導電部22を覆うように透明な合成樹脂製の接着剤を塗布し、該接着剤上に透明樹脂フィルムを貼着する方法も提案されていたが、この方法の場合、通電部26上を露出させる為に該通電部26上の透明樹脂フィルムを切断除去しなければならず、この切断除去作業が非常に厄介であるという問題点があった。しかし、本願では、このような問題は全くなく、上述のように簡単に通電部6を形成することができる。

【0043】尚、本実施例は、メッシュ状導電部2が銅箔8をエッチング処理することにより設けられたプラズマディスプレイ用前面板Aにおいて実施する場合を詳述したが、基板3に繊維織物メッシュを貼着することによりメッシュ状導電部2を設けた場合等、他のプラズマディスプレイから発生する電磁波をメッシュ状導電部によりシールドする機能を有するプラズマディスプレイ用前面板の製造方法においても応用することができる。

【図面の簡単な説明】

【図1】従来例の説明図である。

【図2】従来例の前面板Aの説明平面図である。

【図3】本実施例の説明側面図である。

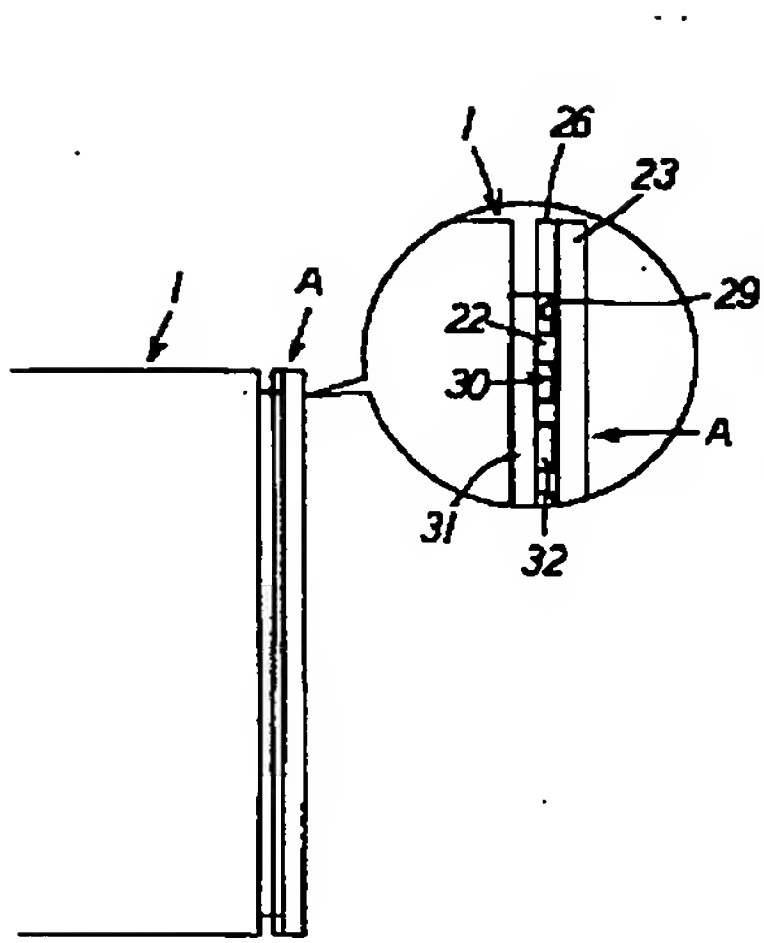
【図4】本実施例の説明側面図である。

【図5】本実施例の説明側面図である。

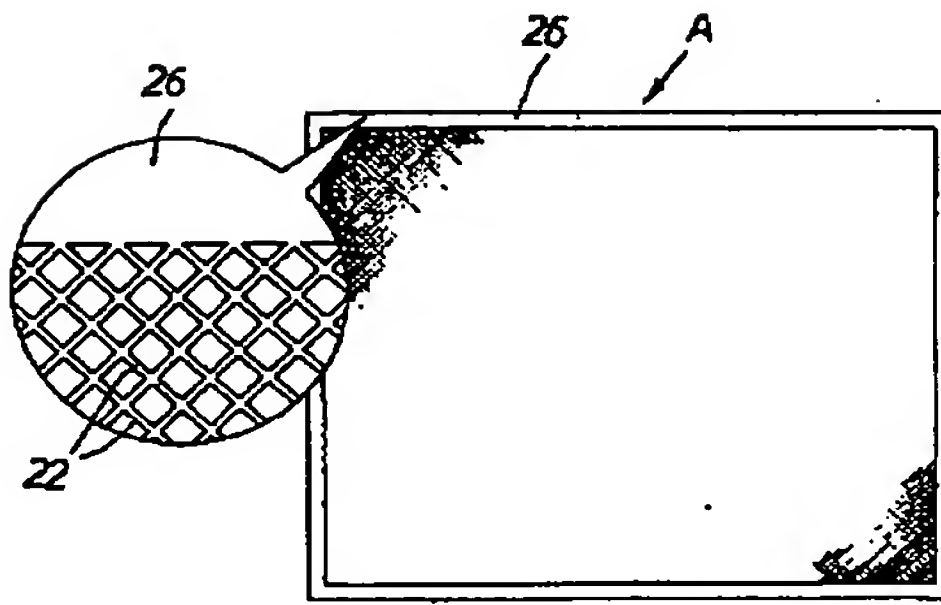
【符号の説明】

- 1 プラズマディスプレイ
- 2 メッシュ状導電部
- 3 基板
- 4 UV硬化型樹脂層
- 5 支持板
- 6 通電部
- 7 マスキング材

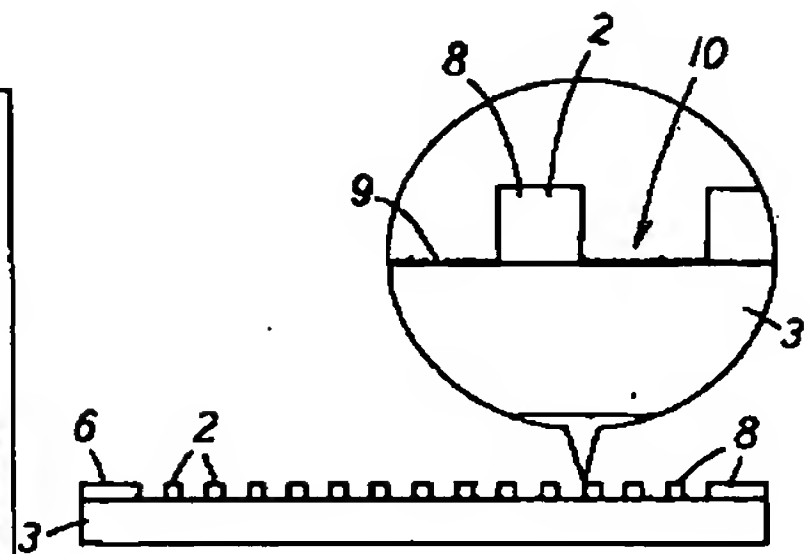
【図1】



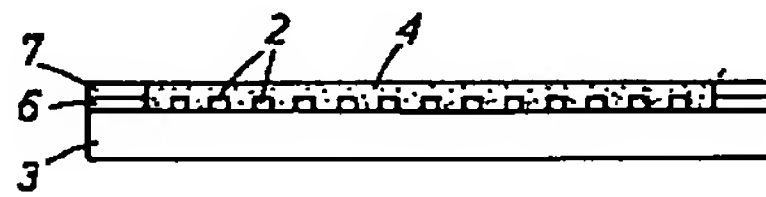
【図2】



【図3】



【図5】



【図4】

